

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**Lesson Plan- MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE**

|  |  |  |
| --- | --- | --- |
| Faculty Name: P.Yamuna | Year / Sem: II/I | Academic Year: 2017-18 |

w.e.f. 12-July-2017

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S.NO** | **TOPICS TO BE COVERED** | **REFERENCE BOOK** | **NO. OF LECTURES REQUIRED** | **DELIVERY METHOD** | **DATE** |
|  | **UNIT-I** |  |  |  |  |
| 1 |

|  |
| --- |
| MathematicalLogic Statements&notations |

 | T1 | 1 | Chalk & Talk | 13-07-2017 |
| 2 | Connectives | T1 | 1 | Chalk & Talk | 15-07-2017 |
| 3 | Well formed formulas  | T1 | 1 | Chalk & Talk | 17-07-2017 |
| 4 | Tautology | T1 | 1 | Chalk & Talk | 18-07-2017 |
| 5 | Equivalence Implication | T1 | 1 | Chalk & Talk | 19-07-2017 |
| 6 | Normal forms | T1 | 1 | Chalk & Talk | 20-07-2017 |
| 7 | Quantifiers | T1 | 1 | Chalk & Talk | 21-07-2017 |
| 8 | Predicates | T1 | 1 | Chalk & Talk | 22-07-2017 |
| 9 | Free and Bound variables | T1 | 1 | Chalk & Talk | 24-07-2017 |
| 10 | Rules of Inference | T1 | 1 | Chalk & Talk | 25-07-2017 |
| 11 | Implications and Equivalences, | T1 | 1 | Chalk & Talk | 26-07-2017 |
| 12 | Consistency, | T1 | 1 | Chalk & Talk | 27-07-2017 |
| 13 | Proof of Contradiction | T1 | 1 | Chalk & Talk | 28-07-2017 |
| 14 | Related Examples | T1 | 1 | Chalk & Talk | 29-07-2017 |
| 15 | Automatic theorem | T1 | 1 | Chalk & Talk | 1-08-2017 |
| 16 | Practicing problems | T1 | 1 | Chalk & Talk | 2-08-2017 |
|  | **UNIT-II** |  |  |  | 3-08-2017 |
| 1 | Relations | T1 | 1 | Chalk & Talk | 4-08-2017 |
| 2 | Properties of Binary | T1 | 1 | Chalk & Talk | 5-08-2017 |
| 3 | r Equivalence | T1 | 1 | Chalk & Talk | 7-08-2017 |
| 4 | , Trasitive closure | T1 | 1 | Chalk & Talk | 8-08-2017 |
| 5 | Compatability | T1 | 1 | Chalk & Talk | 9-08-2017 |
| 6 |

|  |
| --- |
|  Partialorderind relations |

 | T1 | 1 | Chalk & Talk | 10-08-2017 |
| 7 | Lattices | T1 | 1 | Chalk & Talk | 11-08-2017 |
| 8 | Hasse diagram | T1 | 3 | Chalk & Talk | 14-08-2017 |
| 9 | Functions  | T1 | 2 | Chalk & Talk | 16-08-2017 |
| 10 |

|  |
| --- |
| Inverse function,Composition of functions |

 | T1 | 1 | Chalk & Talk | 17-08-2017 |
| 11 | Recursive functions | T1 | 2 | Chalk & Talk | 18-08-2017 |
| 12 |

|  |
| --- |
| AlgebraicStructures |

 | T1 | 2 | Chalk & Talk | 19-08-2017 |
| 13 | Algebraic Systems | T1 | 2 | Chalk & Talk | 21-08-2017 |
| 14 |

|  |
| --- |
| Semigroups,monoids,groups,subgroups |

 | T1 | 1 | Chalk & Talk | 22-08-2017 |
| 15 |

|  |
| --- |
| Homomorphism,Isomorphism |

 | T1 | 1 | Chalk & Talk | 23-08-2017 |
|  | **UNIT-III** |  |  |  | 24-08-2017 |
| 1 |

|  |
| --- |
| ElementaryCombinnatorics Basic ofCounting |

 | T1 | 1 | Chalk & Talk | 26-08-2017 |
| 2 |

|  |
| --- |
| Permutations andCombinations |

 | T1 | 1 | Chalk & Talk | 28-08-2017 |
| 3 |

|  |
| --- |
| Enumeratinr Permutationswith Constrainedrepetitions |

 | T1 | 1 | Chalk & Talk | 29-08-2017 |
| 4 |

|  |
| --- |
| Binomial Coefficiens, |

 | T1 | 1 | Chalk & Talk | 30-08-2017 |
| 5 | Related Problems | T1 | 2 | Chalk & Talk | 1-09-2017 |
| 6 |

|  |
| --- |
| Proof and Examples |

 | T1 | 1 | Chalk & Talk | 4-09-2017 |
| 7 |

|  |
| --- |
| Theorems and Problems |

 | T1 | 1 | Chalk & Talk | 5-09-2017 |
| 8 |

|  |
| --- |
| The Principle of Inclusion -Exclusion |

 | T2 | 1 | Chalk & Talk | 11-09-2017 |
| 9 | Theorems and Problems | T2 | 1 | Chalk & Talk | 12-09-2017 |
| 10 |

|  |
| --- |
| Pegeon hole principles andits application |

 | T2 | 2 | Chalk & Talk | 13-09-2017 |
| 11 |

|  |
| --- |
| Related Examples |

 | T2 | 2 | Chalk & Talk | 14-09-2017 |
| 12 | Transactional models | T2 | 1 | Chalk & Talk | 15-09-2017 |
| 13 |

|  |
| --- |
| Binomial and Multinomialtheorems |

 | T2 | 1 | Chalk & Talk | 16-09-2017 |
| 14 | r- Combinations without | T2 | 1 | Chalk & Talk | 18-09-2017 |
| 15 | repetitions and with repetitions | T2 | 1 | Chalk & Talk | 19-09-2017 |
|  | **UNIT-IV** |  |  |  | 20-09-2017 |
| 1 |

|  |
| --- |
|  RecurrenceRelation Generatingfunctions |

 | T2 | 2 | Chalk & Talk | 21-09-2017 |
| 2 |

|  |
| --- |
| Generating functions ofsequences, Examples |

 | T2 | 1 | Chalk & Talk | 22-09-2017 |
| 3 |

|  |
| --- |
| Calculating co-efficient ofgenerating function |

 | T2 | 3 | Chalk & Talk | 23-09-2017 , 3 -09-2017, 4-09-2017 |
| 4 |

|  |
| --- |
| Geometric series, Use of Partialfraction decomposition,Prorlems |

 | T2 | 2 | Chalk & Talk | 5-10-2017, 6 -10-2017 |
| 5 | Recurrence relations | T2 | 2 | Chalk & Talk | 07-10-2017, 09 -10-2017 |
| 6 | Solving Recurrence relations | T2 | 2 | Chalk & Talk | 10-10-2017, 11 -10-2017 |
| 7 |  substitution&Generating | T2 | 2 | Chalk & Talk | 12-10-2017. 13 -10-2017 |
| 8 |

|  |
| --- |
| The method of Characteristicroots and solution  |

 | T2 | 2 | Chalk & Talk | 16-10-2017, 17 -10-2017 |
|  | **UNIT-V** |  |  |  |  |
| 1 | Graph theory | T2 | 2 | Chalk & Talk | 19-10-2017 ,20 -10-2017 |
| 2 | Trees, Spanning trees | T2 | 1 | Chalk & Talk | 21-10-2017 |
| 3 | Representation of graph | T2 | 1 | Chalk & Talk | 23-10-2017 |
| 4 | BFS,DFS | T2 | 1 | Chalk & Talk | 24-10-2017, 25-10-2017 |
| 5 | Planar graphs | T2 | 1 | Chalk & Talk | 25-10-2017 |
| 6 |

|  |
| --- |
| Definition,Examples & Dual of planar |
| graph |

 | T2 | 2 | Chalk & Talk | 26-10-2017, 27-10-2017 |
| 7 |  Graph theory and Application | T2 | 1 | Chalk & Talk | 28-10-2017 |
| 8 | Basic concepts | T2 | 1 | Chalk & Talk | 28-10-2017 |
| 9 | Basic concepts | T2 | 1 | Chalk & Talk | 30-10-2017 |
| 10 | Euler circuits | T2 | 1 | Chalk & Talk | 31-10-2017 |
| 11 | Euler trail, Euler's formula | T2 | 1 | Chalk & Talk | 1-11-2017 |
| 12 | Definition,Examples & Dual of planar | T2 | 1 | Chalk & Talk | 2-11-2017 |
| 13 | Matrix representation of graph | T2 | 1 | Chalk & Talk | 3-11-2017 |
| 14 | examples |  | 1 | Chalk & Talk | 3-11-2017 |
| 15 | Definitions and Examples | T2 | 1 | Chalk & Talk | 4-11-2017 |
| 16 | Hamiltonian graphs | T2 | 1 | Chalk & Talk | 6-11-2017 |
| 17 | Chromatic numbers | T2 | 1 | Chalk & Talk | 6-11-2017 |
| 18 | The Scheduling problem | T2 | 1 | Chalk & Talk | 7-11-2017 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TEXT BOOKS :** |  |  |  |  |  |  |  |  |
| T1. Mathematical Foundations of Computer science (Discrete structures) |  |  |  |  |  |  |  |
| T2. Discrete Mathematical structures with Applications to Computer science |  |  |  |  |  |

T3. Discrete Mathematics for Computer Scientists & Mathematicians \_ J.L Mott, A. Kandel ,T.P. Baker.

**REFERENCES**

R1. Mathematical Foundations of Computer science \_G.S.S. Bhishma Rao

R2. Logic and Discrete Mathematics - Grass Man &Trembley

**WEB RESOURCES:**

W1:cs103.stanford.edu/

W2:https://books.google.com/.../Mathematical\_Foundations\_of\_Computer\_Sci.html?id.

W3https://books.google.co.in/.../Mathematical\_Foundations\_of\_Computer\_Sci.html?id.

W4:zhpsj.org/wp-content/uploads/2015/01/8122422942 Mathematical\_Foundation.pdf

W5:www.tcs.tifr.res.in/academics/courses/mathematical-foundations-computer-science-1